

## **Analysis of Brownfields Cleanup Alternatives for the Former Machinery Row Property located at 700, 900, and 1010 Water Street Racine, Wisconsin CDA – USEPA Cleanup Grant**

This Analysis of Brownfields Cleanup Alternatives (ABCA) has been prepared for the Community Development Authority of the City of Racine (CDA) to outline options identified and evaluated to complete the cleanup planning process for the Former Machinery Row property located at 700, 900, and 1010 Water Street in Racine, Wisconsin (the “Site”). Alternative cleanup and environmental management activities considered for the site consisted of the following:

- Alternative 1: No Action
- Alternative 2: Installation of Vapor Mitigation Technologies, Natural Attenuation of Groundwater, and Installation of a sitewide Direct Contact Site Cap in support of proposed redevelopment (likely greenspace and/or parking areas will be targeted)
- Alternative 3: Limited Soil Excavation/Off-Site Disposal of Volatile Organic Compounds (VOC)-impacted Soil with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap in limited areas in support of proposed redevelopment (likely greenspace and/or parking areas will be targeted)

### **SITE BACKGROUND**

The Site consists of three separate addresses including 700, 900, and 1010 Water Street, all of which are owned by the RDA (Figure 1). The layout of the site and the parcel boundaries are depicted on Figure 2. The Site is often referred to as the Water Street Redevelopment, which also includes the Promenade site, which is owned by the City of Racine and located at 800 Water Street. This ABCA is only in reference to the CDA-owned properties, which comprise a total of approximately 14.85 acres.

The Site has a long history of industrial operations and multiple historical operators, including J.I. Case, Western Publishing, The Massey Harris Company, and The Chicago, Milwaukee, St. Paul & Pacific Railroad. The Site was acquired by an Iowa-based developer, FDP MR, LLC (FDP) in approximately December 2014, but the developer failed to redevelop the Site. In November 2016, the City of Racine purchased the Promenade property (800 Water Street) from FDP to eliminate blight by creating a public gathering space along the Root River. The CDA purchased the properties at 700, 900, and 1010 Water Street to eliminate blight by preparing the entire Water Street Redevelopment property for private redevelopment. The City-owned Promenade will enhance the livability and access to the Root River for the residential private redevelopment and the City residents as a whole.

Several investigations have been conducted at the Site. A Phase II Environmental Site Assessment (ESA) was conducted for the western portion of the Site by AECOM in September 2014, and a Phase II ESA was conducted for the eastern portion of the Site by Symbiont in October 2014. Site investigation activities were completed by Symbiont, and the results are presented in Symbiont’s July 2015 SI report. Results from soil investigation activities and UST investigation and removal activities conducted at the Site were summarized in the July 2015 Symbiont SI report. An additional six permanent WAC NR 141 monitoring wells were installed on May 31 and June 1, 2018, to monitor natural attenuation at the Site. The investigative results from the monitoring well installation and two subsequent sampling events (June and September 2018) were presented in Ramboll’s Site Investigation Addendum Letter to the WDNR on October 26, 2018.

Since 2018, additional groundwater monitoring activities were completed to assess groundwater impacts at the Site and evaluate for natural attenuation. Monitoring well MW-7 was installed in June

2020 and sampled in June and July 2020. In addition, pre-remedial design soil sampling was completed in 2020 in order to gather the data needed for designing a final site remedy. Thirteen shallow soil probes and one shallow hand auger were advanced in June 2020 to define the extent of VOC and petroleum product soil impacts near the location of a former UST and an on-site maintenance/repair garage.

In general, the site is underlain by a layer of fill material consisting of fine to coarse silty sand with trace crushed concrete, some medium to coarse gravel, and in a few borings, foundry sand, cinders, slag, and brick. Low level impacts of metals, polycyclic aromatic hydrocarbons (PAHs), and volatile organic compounds (VOCs) are anticipated to be addressed by capping and/or limited soil excavation/off-site disposal prior to site redevelopment. Petroleum VOC impacts have been identified on the 700 Water Street parcel, including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, naphthalene, toluene, and xylenes at concentrations exceeding their respective Wisconsin Administrative Code (WAC) NR 720 Residual Contaminant Levels (RCLs) for the groundwater migration pathway. Other VOCs detected in soil include tetrachloroethene (PCE), 1,1,2-trichloroethane and trichloroethene (TCE), and these impacts are generally within the upper 1-4 feet below ground surface (bgs) but extend to depths up to 7-9 feet bgs. A schematic showing the distribution of VOCs, including the petroleum-related compounds is provided as Figure 3.

In addition, low levels of metals, PAHs, and VOCs have been detected in one or more groundwater samples collected from existing monitoring wells on the site. The most recent groundwater sampling events were conducted in November 2019 (MW-1 through MW-6) and July 2020 (MW-7). Based on these sampling results, vinyl chloride was detected in one monitoring well in exceedance of its WAC NR 140 groundwater Enforcement Standard (ES). Other low-level exceedances of the WAC NR 140 groundwater Preventive Action Limit (PAL) for arsenic, PCE, and TCE were observed. The exceedances of WAC NR 140 groundwater quality standards in November 2019 (MW-1 through MW-6) and July 2020 (MW-7) are presented on Figure 4.

## **SITE REDEVELOPMENT PLAN**

The Site is anticipated to be redeveloped for primarily residential development with some mixed-use commercial. Development plans are being prepared, but no specific development has been identified at this time. The area of the Site with low level petroleum-impacted soils will primarily be covered by concrete building slabs or removed from the site during site redevelopment. However, some of these impacted soils present a vapor intrusion risk to the anticipated development if these soils remain in place. It is anticipated that the future redevelopment plans will include a combination of limited hot-spot removal or remediation and site capping plan for the areas with identified impacts. Natural attenuation is the anticipated remedy for the low-level groundwater impacts. It's anticipated that some of the site-capping will be conducted in conjunction with the proposed redevelopment.

All solid wastes generated at the Site, including contaminated soil and other solid wastes generated during response actions associated with this USEPA Cleanup Grant, will be disposed of properly at either a Wisconsin Chapter 289, Stats., licensed landfill or in a manner consistent with the applicable provisions of WAC NR 718.

## **ANALYSIS OF ALTERNATIVES**

Three alternatives for remedial action at the Site were considered with the goal of maximizing the potential for redevelopment, which is currently impaired by the contamination present. The alternatives discussed below were evaluated based on effectiveness, implementability, and cost.

### **Alternative 1: No Action**

The "No Action" alternative was considered but disregarded. While implementable and no cost, it does not meet regulatory requirements for soil and groundwater remediation and would potentially create a risk for direct contact with contaminated soil. It would also significantly hinder the proposed redevelopment of the Site.

**Alternative 2: Installation of Vapor Mitigation Technologies, Natural Attenuation of Groundwater, and Installation of a sitewide Direct Contact Site Cap in support of proposed redevelopment (likely greenspace and/or parking areas will be targeted)**

This alternative consists of the installation of vapor mitigation technologies, such as vapor mitigation barriers and/or sub-slab depressurization systems (SSDS), and the construction of a sitewide direct contact site cap to address localized VOC soil impacts and sitewide PAH and Resource Conservation and Recovery Act (RCRA) metals soil impacts. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA).

The excavation activities will focus on the areas of the site that have been determined to be impacted with petroleum VOCs above WAC NR 720 groundwater pathway RCL and in the vicinity of a former maintenance garage and in the vicinity of a former underground storage tank. Petroleum VOCs, including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, naphthalene, toluene, and/or xylenes, were detected above their respective NR 720 direct contact and/or soil-to-groundwater pathway RCLs. These concentrations of PVOCs, particularly the benzene and naphthalene, could create a vapor intrusion issue for future structures, if left in place. Naphthalene was detected in soil at concentrations ranging from 77.1 to 240,000 µg/kg, with the highest concentrations primarily detected in the area of the former UST. Benzene was detected at 260 ug/kg near the former UST and from 31.7 to 800 ug/kg near the former maintenance garage.

Following excavation of petroleum VOCs as provided above, the low-level soil impacts remaining on the site will be addressed through the construction of a direct contact site cap. A temporary site cap was constructed at the site as part of the site demolition activities, with crushed concrete from former building slabs placed across the site to minimize the risk of direct contact with contaminated soil, in conjunction with perimeter site fencing to limit access to the site; however the temporary cap is not consistent with the final proposed residential site use and is not sufficient to protect future residents of the site. The final site capping plan for the Site will likely consist of building slabs, clean soil cover in green space areas, and paved parking and drive areas as part of the site redevelopment. The building slab portion of the final cap is anticipated to be constructed as part of site redevelopment, while the final site cap in the paved parking and drive areas is anticipated to be constructed as part of this remedial action alternative. A concrete or asphalt pavement cover or a one to two-foot soil cover in greenspace areas would be constructed over an estimated 20% of the site, for the purpose of this alternatives evaluation. The site cap is considered an institutional control that will be listed on the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS) database with a long-term requirement for inspection and maintenance.

MNA was determined to be the most cost effective and technically feasible alternative to address the low-level residual groundwater impacts at the site. There are currently exceedances of WAC NR 140 ESs and PALs at the site, and four additional quarters of MNA groundwater sampling are proposed to document a stable or decreasing plume, prior to receiving final case closure on the site.

Based on the estimated cost of vapor mitigation technology installation and systems, two rounds of MNA groundwater sampling, construction of the site cap, and associated reporting, the estimated remedial cost is \$298,800. Under this remedial alternative, active remediation could be completed within 1 month and regulatory case closure could likely be secured within a 1-year timeframe, after completion of MNA groundwater monitoring.

**Alternative 3: Limited Soil Excavation/Off-Site Disposal of Volatile Organic Compounds (VOC)-impacted Soil with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap in limited areas in support of proposed redevelopment (likely greenspace and/or parking areas will be targeted)**

This alternative consists of limited excavation of petroleum-impacted soil with off-site disposal and the construction of a sitewide direct contact site cap. Residual groundwater impacts will be addressed through monitored natural attenuation (MNA).

The excavation activities will focus on the areas of the site that have been determined to be impacted with petroleum VOCs above WAC NR 720 groundwater pathway RCL and in the vicinity of a former maintenance garage and in the vicinity of a former underground storage tank. Petroleum VOCs, including 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, benzene, naphthalene, toluene, and/or xylenes, were detected above their respective NR 720 direct contact and/or soil-to-groundwater pathway RCLs. These concentrations of PVOs, particularly the benzene and naphthalene, could create a vapor intrusion issue for future structures, if left in place. Naphthalene was detected in soil at concentrations ranging from 77.1 to 240,000 µg/kg, with the highest concentrations primarily detected in the area of the former UST. Benzene was detected at 260 ug/kg near the former UST and from 31.7 to 800 ug/kg near the former maintenance garage.

Following excavation of petroleum VOCs as provided above, the low-level soil impacts remaining on the site will be addressed through the construction of a direct contact site cap. A temporary site cap was constructed at the site as part of the site demolition activities, with crushed concrete from former building slabs placed across the site to minimize the risk of direct contact with contaminated soil, in conjunction with perimeter site fencing to limit access to the site; however the temporary cap is not consistent with a residential site use and is not sufficient to protect future residents of the site. The final site capping plan for the Site will likely consist of building slabs, clean soil cover in green space areas, and paved parking and drive areas as part of the site redevelopment. The building slab portion of the final cap is anticipated to be constructed as part of site redevelopment, while the final site cap in the paved parking and drive areas is anticipated to be constructed as part of this remedial action alternative, with funding awarded to the Site through a USEPA Cleanup Grant. A concrete or asphalt pavement cover or a vegetated, 18- to 24-inch thick clean soil cover in greenspace areas would be constructed over an estimated 20% of the site, for the purpose of this alternatives evaluation. The site cap is considered an institutional control that will be listed on the WDNR's Bureau for Remediation and Redevelopment Tracking System (BRRTS) database with a long-term requirement for inspection and maintenance.

MNA was determined to be the most cost effective and technically feasible alternative to address the low-level residual groundwater impacts at the site. There are currently exceedances of WAC NR 140 ESs and PALs at the site, and four additional quarters of MNA groundwater sampling are proposed to document a stable or decreasing plume, prior to receiving final case closure on the site.

Based on the estimated extent of soil contamination at the subject site, the estimated cost to implement the soil excavation/off-site disposal including four rounds of MNA groundwater sampling, construction of the site cap, and associated reporting is \$126,800. Under this remedial alternative, active remediation could be completed within 1 month and regulatory case closure could likely be secured within a 1-year timeframe, after completion of MNA groundwater monitoring.

## **RECOMMENDATION**

Based on this remedial alternative analysis and in consideration of the remedial activities conducted to date, it is concluded that the most cost-effective and technically feasible alternative to complete the remedial action is Alternative 3: Limited Soil Excavation/Off-Site Disposal of Volatile Organic Compounds (VOC)-impacted Soil with Natural Attenuation of Groundwater and Installation of Direct Contact Site Cap in limited areas in support of proposed redevelopment (likely greenspace and/or parking areas will be targeted). Proposed soil excavation areas under this alternative are presented on Figure 5. Under this alternative, regulatory case closure could likely be secured within a 1-year timeframe, and redevelopment potential would be maximized for the Site.

## **DECISION DOCUMENT**

A decision document will be issued at the close of the 30-day public comment period with additional details on the selected alternative.



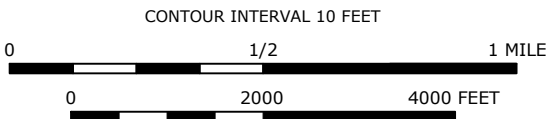
L:\Loop Project Files\CAD\1690005038\_Racine\002\01\_Site Location Map.dwg



**LEGEND:**

— PROPERTY BOUNDARY  
(APPROXIMATE)

**SOURCE:**  
2016 USGS 7.5 Minute Series Racine South, Wisconsin Topographic Quadrangle.  
Site Location; N: 42.727594° W: 87.789624° WGS84



**SITE LOCATION MAP**  
FORMER MACHINERY ROW PROPERTY  
700, 900, AND 1010 WATER STREET  
RACINE, WISCONSIN

**FIGURE**  
**1**

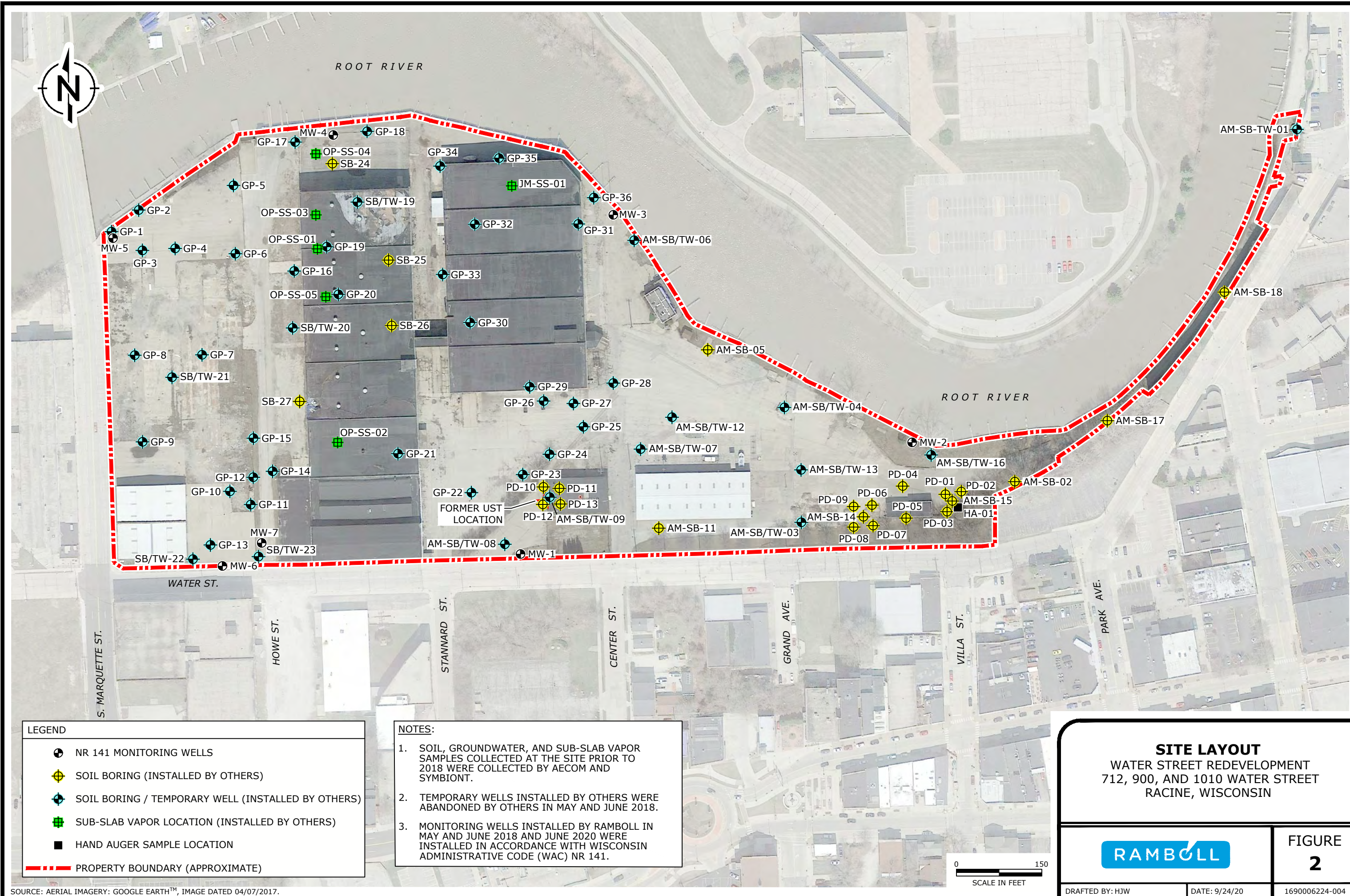
DRAFTED BY: HJW

DATE: 1/3/19

1690005038-002



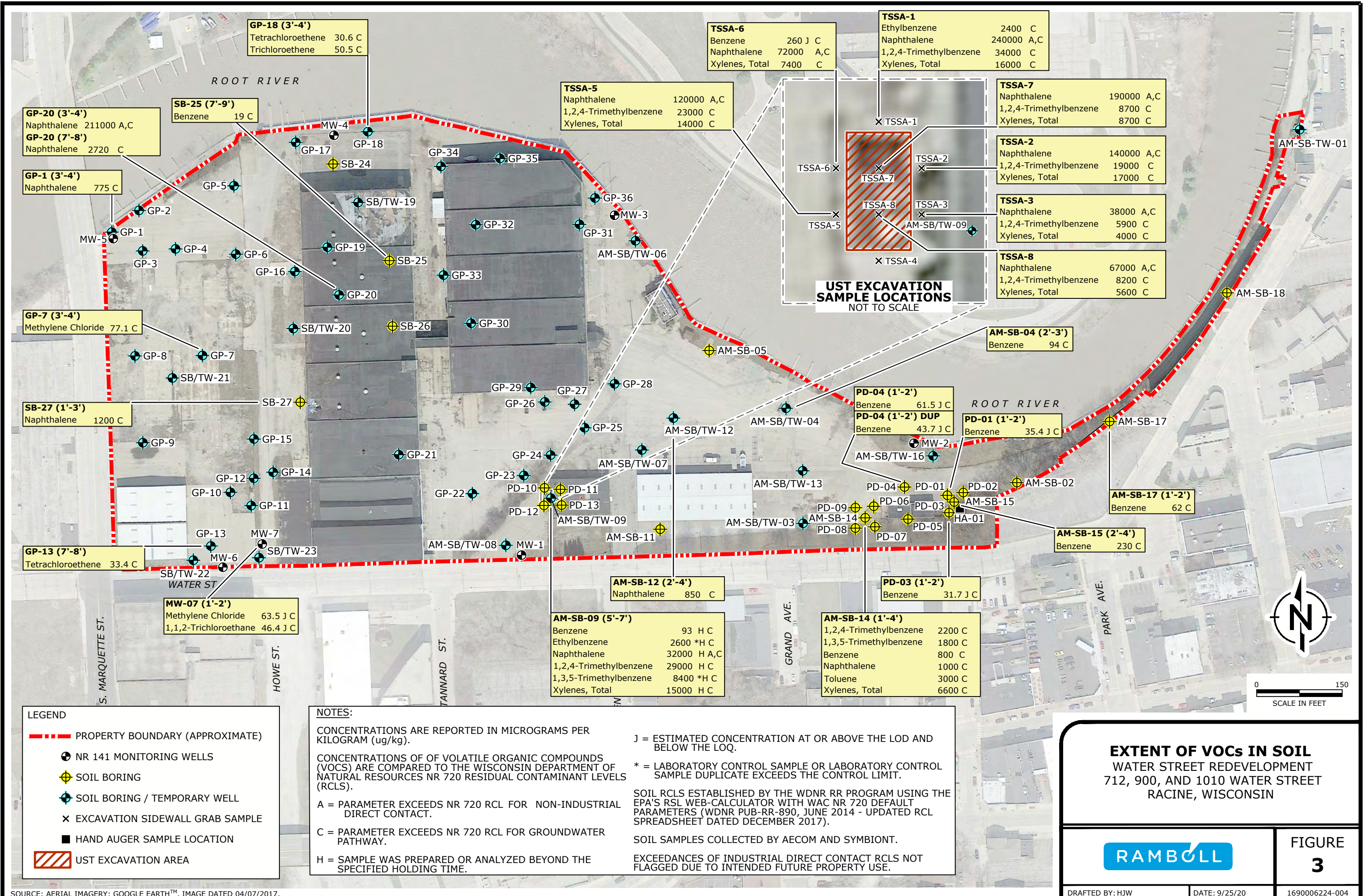
L:\Loop Project Files\CAD\1690006224\_Racine\_Machinery Row\0041\_RAOR\_RAP02\_Site Layout.dwg



SOURCE: AERIAL IMAGERY: GOOGLE EARTH™, IMAGE DATED 04/07/2017.



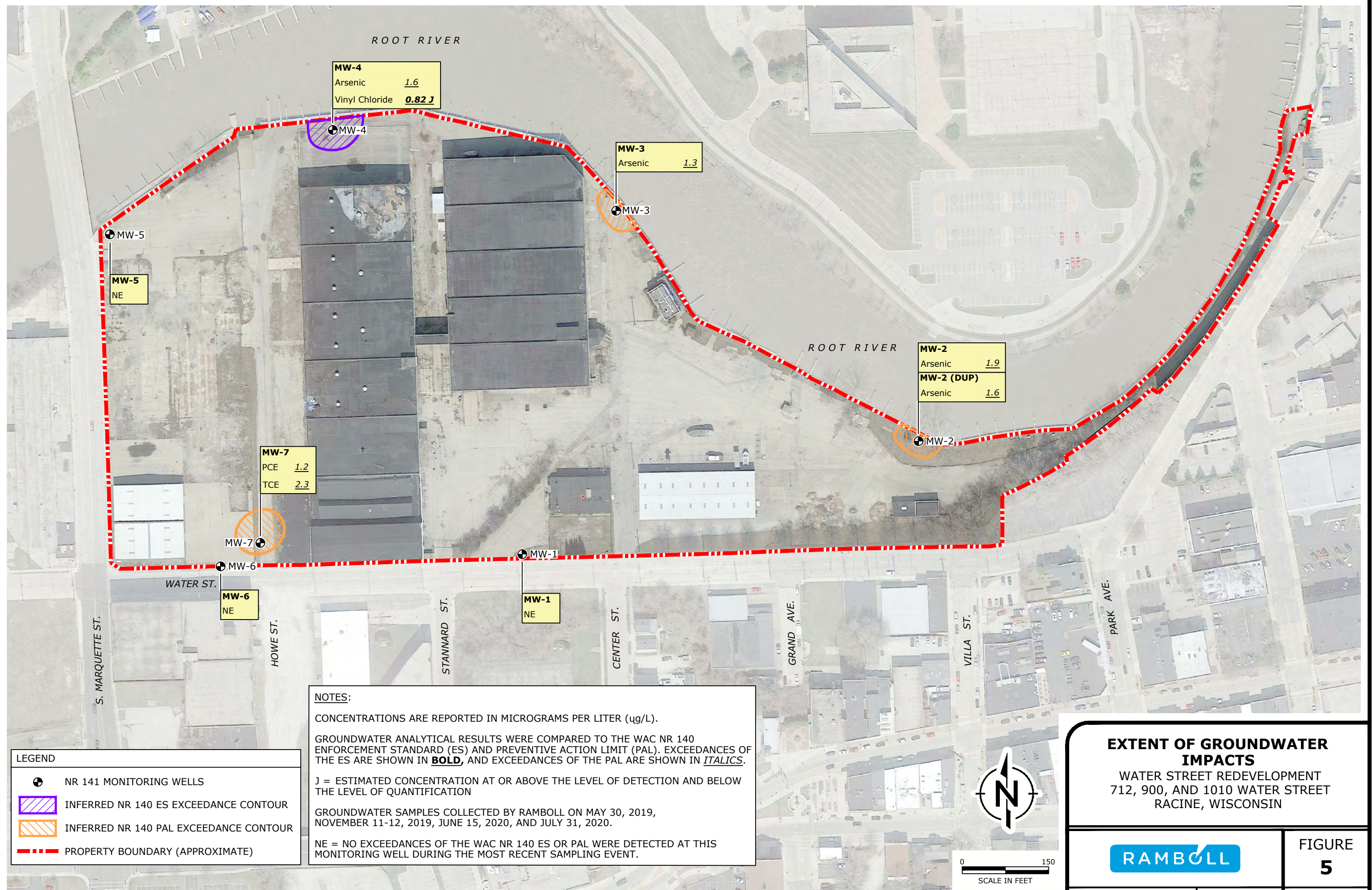
L:\Loop Project Files\CAD\1690006224\_Racine\_Machinery Row\0041\_RACOR\_RAP\04\_Extent of VOCs in Soil.dwg



SOURCE: AERIAL IMAGERY: GOOGLE EARTH™, IMAGE DATED 04/07/2017.



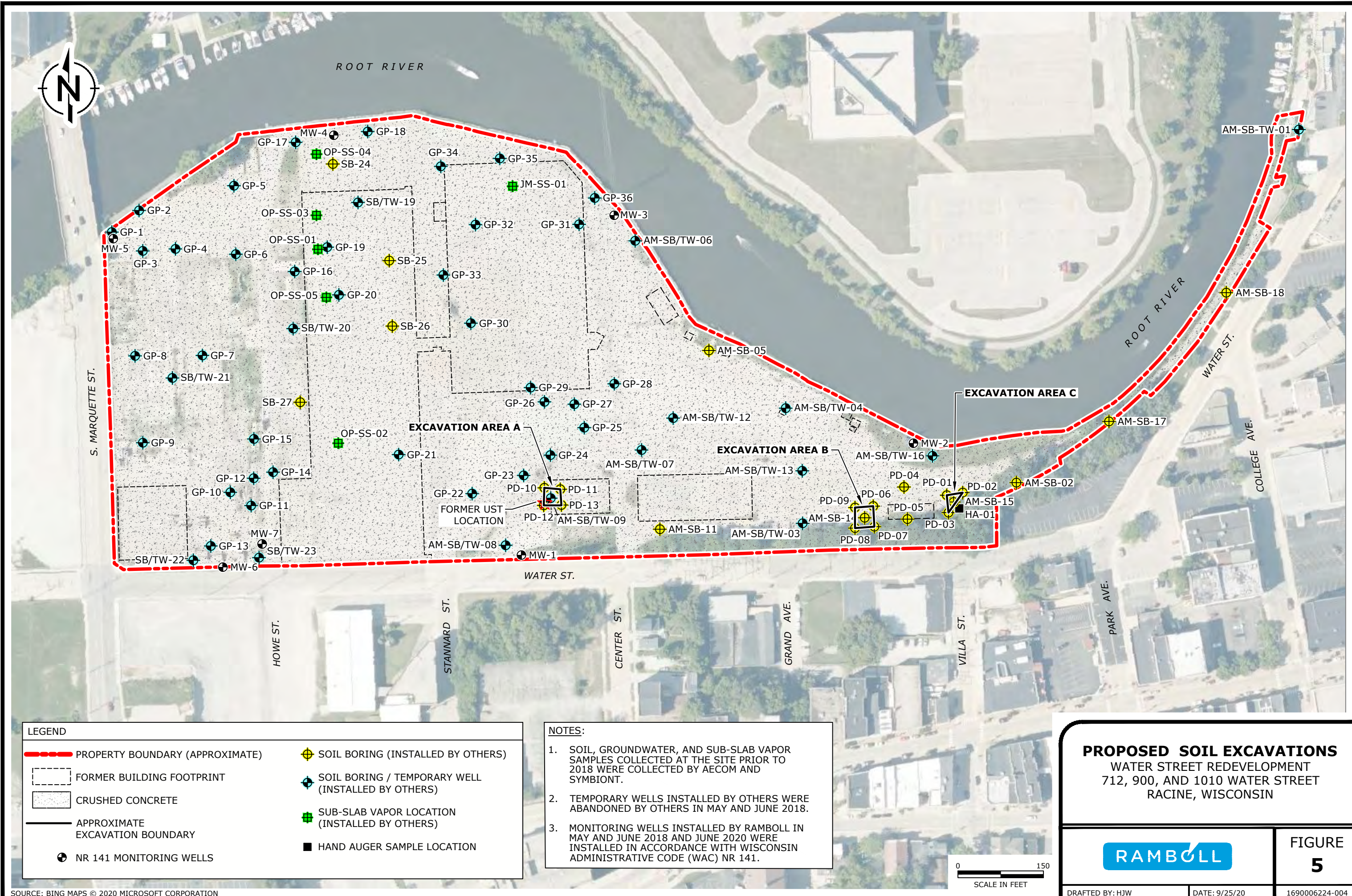
L:\Loop Project Files\CAD\1690006224\_Racine\_Machinery Row\0041\_RAOR\_RAP\05\_Extent of Groundwater Impacts.dwg



SOURCE: AERIAL IMAGERY: GOOGLE EARTH™, IMAGE DATED 04/07/2017.



L:\Loop Project Files\CAD\1690006224\_Racine\_Machinery Row\0041\_RAOR\_RAP\06\_Proposed Soil Excavations.dwg



LEGEND

PROPERTY BOUNDARY (APPROXIMATE)

FORMER BUILDING FOOTPRINT

CRUSHED CONCRETE

APPROXIMATE EXCAVATION BOUNDARY

NR 141 MONITORING WELLS

SOIL BORING (INSTALLED BY OTHERS)

SOIL BORING / TEMPORARY WELL (INSTALLED BY OTHERS)

SUB-SLAB VAPOR LOCATION (INSTALLED BY OTHERS)

HAND AUGER SAMPLE LOCATION

NOTES:

1. SOIL, GROUNDWATER, AND SUB-SLAB VAPOR SAMPLES COLLECTED AT THE SITE PRIOR TO 2018 WERE COLLECTED BY AECOM AND SYMBIONT.

2. TEMPORARY WELLS INSTALLED BY OTHERS WERE ABANDONED BY OTHERS IN MAY AND JUNE 2018.

3. MONITORING WELLS INSTALLED BY RAMBOLL IN MAY AND JUNE 2018 AND JUNE 2020 WERE INSTALLED IN ACCORDANCE WITH WISCONSIN ADMINISTRATIVE CODE (WAC) NR 141.

PROPOSED SOIL EXCAVATIONS

WATER STREET REDEVELOPMENT

712, 900, AND 1010 WATER STREET

RACINE, WISCONSIN

RAMBOLL

FIGURE

5

DRAFTED BY: HJW

DATE: 9/25/20

1690006224-004